



# No June Club Meeting

## Due to COVID-19 rules on gatherings

## Socialize on the airwaves instead

Amateur Radio, communicating in isolation for over 100 years



DMR Hot Spot MMDVM board on a pi zero, just one of a huge range to choose from  
DMR is one of the fastest growing areas of Amateur Radio evolving rapidly and cheap to get into

DMR Fun	2
Vale Bob Knaggs, pioneer of hand-held radios at CFA	10
VK3RTV Update	12
How Big Is A Million, Billion, Trillion	18
An Economic Explanation	20
NEVARC Nets	21
NEVARC Club Profile	22

# DMR Fun

After hearing about DMR from on air discussions and the internet, it was time to try out this mode. Many I spoke to said I am in for a learning curve, but with past playing with Packet AX25, Dstar, C4FM (fusion as Yaesu like to call it) it seemed like DMR was just another set of acronyms and programming instructions to learn. To date that appears true enough.

After chatting to a few people I decided on the radio and a “hot spot”. More about a “hot spot” later.

As with all things, you are spoilt for choice, which is sometimes the biggest hassle.

The guys at MATARG suggested the RADIODDITY GD-77.

I ordered one and they had a special on at the time and I got an extra battery.

The whole order, posted from China to VK was just \$86.

That's right a DMR Radio, programming cable, two batteries, all postage and GST, included for \$86.



The GD-77 is a Dual Band, 2m & 70cm, 2 Time-Slot DMR with 2200mah battery, 1 watt or 5 watts.

They say...

## *Dual Band & Dual Time Slot*

*-The newest upgraded software and firmware have added:*

*Add VFO, Contact ID (expanded from 256 to 1000),*

*Scan list (expanded from 16 to 64) & Channel list (expanded from 16 to 31),*

*DMR ID Database,*

*Fix of lost Zones bug and upgraded RX audio quality.*

*GD-77 DMR two way radio has both Tier I & II and is compatible with Motorola and other DMR radios.*

*That bit is important!!!*

## *Larger Capacity Li-Ion Battery –*

*This radio is equipped with a 2200mAh Li-ion Battery.*

*Up to 18 hours working time as well as 48 hours of standby time.*

*This is 30% longer than other DMR HT's.*

*It feels really good in the hand - and is solid but not too heavy.*

*It has crystal clear audio and it's easy to program.*

## *USB Port Charger or Wall charger –*

*A USB port charger or a wall charger are supplied with this radio.*

*For USB port chargers, please note that the USB port and charger adapter can only work with a radio requiring 12V input.*

## *More Operations Available via Keypad –*

*Channel name, TX & RX frequency of a channel, display or hidden frequency, channel number, etc.*

*All these can be modified through the keypad of GD-77.*

*You can program one of the side or top keys to change zones.*

But you pick what you want, lots of DMR stuff on EBay. But be warned, some DMR stuff is crap.

The manual comes in German and English, easy to read and to the point.

But of course in true ham radio style I didn't read it until weeks later, after everything was set up.

I watched a few youtube videos and they really helped.

The radio can of course be used portable. It also does FM, so you can still use all the FM repeaters.

But for around the house you can plug a “hot spot” into the internet and transmit to that and it transmits back to you at 10 milliwatt. This enables you to dial up a DMR repeater or a talk group and “tunnel” via the internet to wherever you select on your radio. So you can talk to what you pick.

All DMR users are allocated a unique user number that you program into your radio. This allows you to be “found” on the network as the world database kept in real time tracks where you accessed into the system. So you can actually use it like a telephone, calling a specific DMR ID to talk to a chosen person. If you don’t know their ID you can search for that online also.

## **THE BASICS OF DMR DIGITAL MOBILE RADIO**

### **Introduction:**

"The nice thing about standards is there are so many to choose from."

I love the ironic humour in this statement; a standard should result in everyone doing things the same way in order to be compatible, and prevent having to constantly re-invent the wheel.

Yet, everyone has to have their own standard!

Just take two way radio digital voice systems for example: there’s P25 phase 1 and phase 2, NDXN, DMR, TETRA, OpenSky, Provoice, and dPMR, along with a whole host of legacy digital voice modes as well. That doesn’t even consider the ham radio contenders, such as DStar, Fusion, FreeDV, some old offerings from Alinco & AOR and so on. And guess what? Absolutely none of them are compatible!

Choosing what digital voice standard you’ll go with can be daunting.

For emergency services and government communications, P25 is by far the most dominant, there’s no doubt about that.

For business & private radio, DMR followed by NXDN are the two most popular choices.

In the ham radio arena, the picture is a little less clear.

DStar took an early lead, but Yaesu is keen to take market share with their Fusion offering.

Hams have always been keen to leverage off existing commercial equipment, and it seems the most popular commercial system adopted presently is DMR.

DMR will take the lead in both the commercial business & private two way radio field as well as in ham radio.

This is helped in no small part by the ready availability of DMR radio equipment at prices that rival traditional analogue two way radio and that one of the biggest names in two way radio, Motorola, are throwing their weight behind DMR.

### **There are three ‘tiers’ or levels of functionality for DMR systems.**

Tier 1: The simplest form of DMR is Tier 1, which is mainly used for simplex communications, with no repeaters. Human voice is digitally sampled and compressed with the AMBE+2 codec, and then transmitted in this digital form to another radio.

Tier 2: Things start to get a bit more complicated here. With Tier 2 DMR, repeaters are used in a TDMA arrangement, with two ‘timeslots’. What this means is that two completely separate radio transmissions can be going through the repeater at the same time; each radio takes turns in transmitting in short 27.5 millisecond bursts.

In addition to this, radios can be set to logical closed groups called ‘talk groups’, which you can think of as ‘virtual channels’. Repeater can be linked via the internet to form networks that can be as small as just two repeaters or thousands of repeaters across the world. Again, the AMBE+2 codec is used to turn speech into compressed data for transmission.

All amateur radio DMR systems are Tier 2, as are many business / commercial radio DMR systems.

Tier 3: This is effectively a trunked radio system on top of Tier 2. A pool of frequencies is used to carry the TDMA transmissions. This is used by more complex or larger networks for big businesses and commercial radio users.

### **The advantages of DMR:**

So why go to all this trouble, when plain old analogue FM works perfectly well?

DMR has the advantage that it four times more efficient when it comes to spectrum usage. For one 25 kHz analogue FM channel, you could fit four DMR transmissions. Not only that, but DMR offers some very flexible calling facilities - you can call one person, a group of people, or everyone in your fleet at once.

While not every DMR network supports it, sending of data and short messages is also possible. DMR is also designed to be easy to network, with connections using IP, so creating wide coverage areas using a network of DMR repeaters is already built-in; cover your city or cover the entire country!

Yet another advantage is because a DMR transmitter is only turned on about half the time due to it transmitting in bursts, battery life is longer.

### **Some DMR jargon:**

**Colour codes:** Every DMR transmission uses a 'colour code' which is very similar to CTCSS or PL tones in the analogue radio world. On a repeater or simplex frequency, every radio must use the same colour code to be able to communicate together. The main use for colour codes is for where two repeater coverage areas on the same frequency may overlap, different colour codes are used to ensure each radio accesses the correct repeater.

**Timeslot:** For Tier 2 and 3 systems, a timeslot is a slice of time, about 30ms long, that a radio can transmit in, or receive in. There are two timeslots per frequency, and you need to have your radio configured for the right colour code for the repeater, the correct timeslot and correct talkgroup for you to be able to hear anything.

**Zones:** This is simply a collection of channels & talkgroups, all grouped together in one 'zone' or bank. A radio user can switch zones to access a different lot of channels & talkgroups that they may wish to use. Typically zones are divided into repeaters for different areas, so you might have one zone for the west side of a city, and another covering the east side of the city - but there's nothing to say that you must set up a zone that way.

**Code Plug:** This is a Motorola term that has stuck over the years, and in the DMR context means a complete configuration file of channels, talkgroups, zones, contacts etc. for a radio. The code plug can be saved to computer disc, and is used to program a radio to give it the functionality a user requires.

**CPS:** Another Motorola term, meaning Customer Program Software. Simply put, this is the software you'd use to create a 'code plug' and configure your radio.

**Hotspot:** A small box that connects to the internet and acts like your own personal low power DMR repeater, useful if you're not in range of a DMR repeater to access.

You can even take them with you and use your cell / mobile phone wireless data to connect the hotspot to the internet and be able to use DMR anywhere you get cellular signal.

Most hotspots are multi-mode, handling not only DMR but DStar, Yaesu Fusion and P25 as well. ZUMspot, Jumbospot, Openspot, MMDVM etc are all examples of hotspots that you can buy or build yourself.

### **So what's in it for me?**

The use of DMR in radio hobbyist circles falls into two categories: ham / amateur radio and scanning receiver use.

Lets take a quick look at each:

#### **Ham radio:**

Hams have long taken advantage of surplus, second hand, or even new commercial radio equipment and repurposed it for their own use, and DMR equipment is no exception. Worldwide, DMR enabled and connected repeaters are appearing and are interconnected to provide a huge linked network spanning the entire globe. Depending on the talk group selected, you could be communicating just around town, across your region, across the entire country, and some groups even cover the world. Motorola DMR equipment is frequently used, but increasingly the cheaper units, in particular TYT, have increased the affordability and availability of DMR equipment to the mass market. In some cases, you can get on air to the DMR scene for less than a hundred dollars!

#### **Scanning:**

As the world relentlessly marches on to a digital future, many businesses and commercial interests have migrated their legacy analogue FM two way radio systems to DMR. There are scanners available that can hear DMR, enabling the scanning hobbyist to continue to listen to such transmissions. For those hobbyists who can't justify the high price tag of those scanners to listen in to DMR, there are other alternatives: certain computer software can decode DMR with a regular scanner and a 'discriminator tap', or a 'virtual audio cable' if using an SDR, or if portable DMR reception is desired, an entry level DMR transceiver from TYT or Radioddity, or particularly the Anytone AT-D868UV or AT-D878UV will do the job very well - to keep yourself on the correct side of the law, you should disable any transmit capabilities of these transceivers.

Lots more info at <https://vkdmr.com/>

### **The Beginners Guide to Hotspots**

A hotspot, simply put, is your internet gateway to a particular DMR network.

You would use a hotspot when you either don't have a DMR repeater nearby, or simply don't want to tie it up for any length of time.

Many hotspots are capable of multiple modes as well, such as D-Star, P25, DMR+, YSF and NXDN... but we are only going to talk about DMR here.

To begin, let's just say there is no single answer to how each brand/model of hotspot should be configured.

Depending on what firmware you are running, what digital modem board you are using etc... there are going to be variations.

So we are going to focus on the basics and give EXAMPLES of how it can be done, though not necessarily how it should be done.



To start, here is a great video that walks you through how to setup Pi Star on a MMDVM Hat hotspot. This is a very common hotspot configuration and one that really sets the base for understanding how they work. This video by KJ4YZI – Ham Radio Concepts covers a lot of information that can be universally used on many hotspot configurations.

The video is around 20 minutes long and it is very much worth watching.

[https://www.youtube.com/watch?v=DDZMY\\_6qjI&feature=youtu.be](https://www.youtube.com/watch?v=DDZMY_6qjI&feature=youtu.be)

If you only have ONE hotspot, configure it using your Radio ID.

Do NOT add a 0 or 1 on the end like some might suggest.

This is only relevant if you have multiple hotspots running at the same time. This is rare.

Be mindful of what Talk Group you are using and how many repeaters it is keying up on the network.

This is especially important if you are rag chewing with a friend who is also on a hotspot.

It might be best to choose a TAC channel for that.

Remember that hotspots are generally reliant upon good WiFi, I put mine right next to it, to be certain.

So if you are using a cell phone for your WiFi source and driving around in a vehicle, you are likely going to have more complaints from those that you are talking to about the reliability of your transmissions.

It's just something that you are going to have to deal with.

Cell phone networks can be spotty and have latency here and there, which will cause you more R2D2 issues. Both on transmit and receive. It's normal for this to happen.

Don't forget to check your BER (bit error rate) in the hotspot Dashboard. If it's too high, check your RXOffset and TXOffset. You might need to adjust it higher or lower to get your BER down around 0.2% or less.

This is VERY important to achieve reliable usage of your hotspot.

Radio frequency accuracy varies, so be sure that your hotspot and radio are working well together.

VK Hotspot live info <http://hot.vkdmr.com/>

Worldwide live DMR repeater database <https://ham-digital.org/dmr-rptr.php#AUS>

Another excellent source of info <https://amateurradionotes.com/pi-star.htm>



The hotspot and DMR radio



Hotspot runs on a Pi Zero

ID	Hotspot	Freq	Power	Usage
36	VK3PSW	Albury NSW (28)	505212301	5 3809 3810
37	VK3PWR	Glenfield, QF56ka (29)	5052015	5 8/2
38	VK3RF	Bondi, QF56PC (29)	505210501	
39	VK3TNT	Nelson Bay, QF67bg (23)	5052378	5 3809
40	VK3VE	VK3VE (30)	5052051	
41	VK3WPJ	Fallford, QF67V (26)	5052536	5 3809
42	VK3XLJ	Orange, QF48N (24)	5052090	3809
43	VK3YE	Mount Vernon, NSW QF (26)	5050328	
44	VK3YF	Toronto QF56TX (21)	5052119	
45	VK3ZBB	Portable Australia (27)	505225402	
46	VK3ZX	VK3ZX (30)	5052260	
47	VK3A3A	VK3A3A (30)	5053153	
48	VK3A3C	Ballarat (21)	5053207	
49	VK3AS	Horsesham QF13og (25)	5053055	
50	VK3BEB	Ballarat (23)	505033503	1 5 3809
51	VK3BIA	VK3BIA (25)	5050652	
52	VK3BK	Coburg, ALU (30)	5053149	
53	VK3BQO	Drouin, Victoria (27)	5053153	
54	VK3BLF	Drouin West (29)	5050390	3809
55	VK3CAT	Brighton East (23)	5053408	3809
56	VK3CDE	Melbourne QF22 (22)	5053401	5
57	VK3CH	Doncaster, Vic QF22N (23)	505055501	5 3809
58	VK3CRT	Grantham, Victoria (26)	5053344	
59	VK3DQ	Warrnambool, QF22 (27)	505331401	5 3809 3810
60	VK3EI	Melbourne, QF22 (27)	5053139	5 3809 3810
61	VK3FELG	Delacombe, QF12M (23)	5050450	3809
62	VK3FKAM	Coronet Bay (24)	5050302	5 3809
63	VK3FOAB	Avonsleigh, Victoria (30)	5050677	
64	VK3FPR	Koonoomoo Vic (29)	5053121	5
65	VK3FRUD	Geelong (22)	5050535	
66	VK3FS	Mount Martha QF21MR (28)	5050189	5 3809
67	VK3GL	Bunyip, Victoria (29)	5053053	5 3809
68	VK3GY	Warragul QF21bu (21)	50532903	5 3809
69	VK3GY	Mobile ALU (23)	50532906	
70	VK3HAW	Shepparton (26)	5050812	5 3809
71	VK3HFZ	California Gully (23)	5050034	5 8/5
72	VK3JFK	(28)	5053154	
73	VK3JLM	Western Port Airfield (28)	5050210	
74	VK3JMA	VK3JMA (27)	505304202	
75	VK3KBC	MLBlackwood QF22BK (24)	5053326	
76	VK3KQT	Buninyong, Au (24)	505033721	5 3809 3810
77	VK3KRV	Endeavour Hills (30)	505327702	

A screen grab of the VK Hotspots and real time use, mine appears at 57 on the list

My digital dashboard that displays connections to my hotspot updated in real time  
You also configure your hotspot via the web interface

Time (AEDT)	Mode	Call Sign	Target	SPC	Dur (s)	Loss	BER
13:41:26 Jan 31st	DMR Slot 2	5054485	TG 505	Net	1.4	0%	0.0%
13:48:42 Jan 31st	DMR Slot 2	5052090	TG 505	Net	39.4	0%	0.0%
13:44:16 Jan 31st	DMR Slot 2	5057809	TG 505	Net	8.5	0%	0.0%
13:21:05 Jan 31st	DMR Slot 2	5053405	TG 505	Net	1.9	0%	0.0%
13:17:17 Jan 31st	DMR Slot 2	5054992	TG 505	Net	2.7	33%	0.7%
13:09:18 Jan 31st	DMR Slot 2	5054365	TG 505	Net	3.4	0%	0.0%
13:05:58 Jan 31st	DMR Slot 2	5053153	TG 505	Net	0.5	0%	0.0%
13:05:29 Jan 31st	DMR Slot 2	5053331	TG 505	Net	1.9	0%	0.0%
13:00:17 Jan 31st	DMR Slot 2	5057068	TG 505	Net	0.8	0%	0.0%
12:49:35 Jan 31st	DMR Slot 2	5058663	TG 505	Net	2.3	0%	0.0%
12:47:11 Jan 31st	DMR Slot 2	5050812	TG 505	Net	0.5	0%	0.0%
12:43:19 Jan 31st	DMR Slot 2	5053239	TG 505	Net	2.6	2%	0.0%
12:42:54 Jan 31st	DMR Slot 2	5054492	TG 505	Net	21.7	4%	0.0%
12:35:23 Jan 31st	DMR Slot 2	5052131	TG 505	Net	1.2	0%	0.0%
12:33:20 Jan 31st	DMR Slot 2	5052114	TG 505	Net	7.0	0%	0.0%
12:09:46 Jan 31st	DMR Slot 2	5054348	TG 505	Net	0.5	0%	0.0%
12:01:50 Jan 31st	DMR Slot 2	4900	TG 9	Net	2.3	0%	0.0%
11:49:12 Jan 31st	DMR Slot 2	5054857	TG 505	Net	3.0	2%	0.0%
11:36:55 Jan 31st	DMR Slot 2	5054273	TG 505	Net	2.3	0%	0.0%
11:21:20 Jan 31st	DMR Slot 2	505477	TG 505	Net	5.9	0%	0.0%

My hotspot running just 10 milliwatt gets an error free data distance of 250 meters to my DMR handheld. Getting on DMR is reasonably priced; give it a go, its growing very fast worldwide. Remember Foundation Licensees can use digital modes now and I have heard quite a few on DMR.



## Increasing the Hot Spot range



While at Strictly Ham, Ross suggested a new mini antenna to extend the handhelds range.

With the hotspot only transmitting 10 milliwatt, I replaced the supplied 3cm antenna with a Diamond SRH770S.

This gave a bit more range, not as much as I hoped, but the range I already had went from a little scratchy at times to full quiet, full signal strength.

SRH770S Details,

Length: 70cm

Weight: 45g

Gain: 2.15dBi (144MHz), 4.5dBi (430MHz)

Impedance: 50ohms

Maximum power rating: 10W FM

Connector: SMA-P

Antenna Design: 3/8wave (144MHz), 3/4wave (430MHz)

The hotspot just sits on top of the internet modem, on the floor, in a spare room.

I could try putting it up higher, but if I go mobile / portable, I would just use a repeater with DMR access.

2 meter VK repeaters with DMR access are,

VK4RNX, VK4RMC, VK4REG, VK4RGX, VK4RTQ, VK2RLE, VK2RCG, VK2RHT, VK2RHR, VK2RGN, VK1RBM, VK3RZU, VK3RPT, VK3RMM, VK3RPS, VK3RTE, VK3RMC, VK3RSU, VK7RJG, VK7RCR, VK5RSF, VK6RLM, VK4RBK, VK4RVR, VK4RLU, VK4RBT, VK3RGL, VK2RAO, VK2RCV, VK3RGV, VK6RPT, VK2RMB, VK4RSL, VK2RWI, VK8RDM, VK2RYS, VK4RDB, VK3RDR, VK3RTA, VK6RPN, VK2RFI, VK2ROJ, VK4RMA, VK3RWV, VK2RHK, VK3RDS, VK2RPH, VK3RHD, VK7RAD, VK7RAK, VK3RMP.

More with DMR access are coming online all the time.



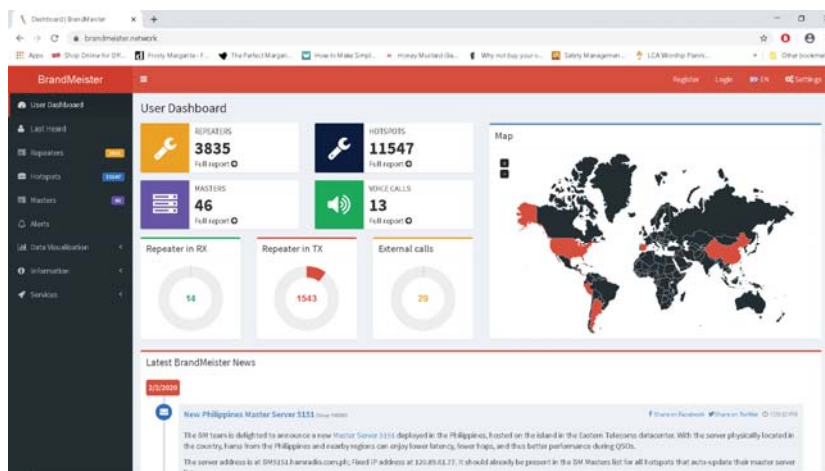
## Linking the Hotspot to NEVARC Repeater VK3RWO

Chatting to Matt VK3SMB, he told me the VK3RWO repeater is on the DMR Network, but using the Brandmeister Network. NEVARC now has Brandmeister TG 505319 connected permanently to VK3RWO via Analog\_bridge. To be able to connect my hotspot to VK3RWO requires my hotspot to become a dual system, setup for both the VK-DMR and Brandmeister data protocols.

You need to register your DMR ID number with Brandmeister and then configure it in the hotspot; they will use your same ID number to register you on the Brandmeister Network (BM).

I registered at <https://brandmeister.network/>

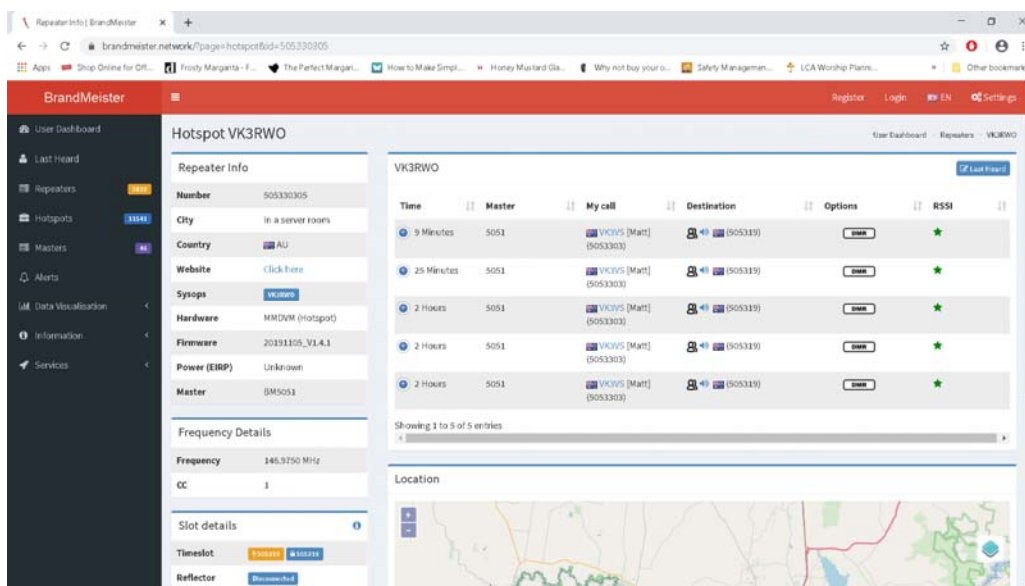
### Brandmeister Dashboard login screen



They say it takes a couple of days to have your credentials verified, but mine were approved in hours.

The hotspot is setup as a DMR gateway, with both networks setup using your DMR ID, prefixing both as 01. You will need to do some BM self care setup in their portal once registered and setup hotspot security and copy BM API to local Pi-star co figuration. And then if you use the VK3RWO repeater DMR ID you can pop out on the repeaters local RF and talk to stations connected locally to the repeater via the hotspot, you will need to have TG9 set in your receive group.

### Brandmeister Dashboard – VK3RWO Repeater Details



~Mick VK3CH

# Vale Bob Knaggs, pioneer of hand-held radios at CFA

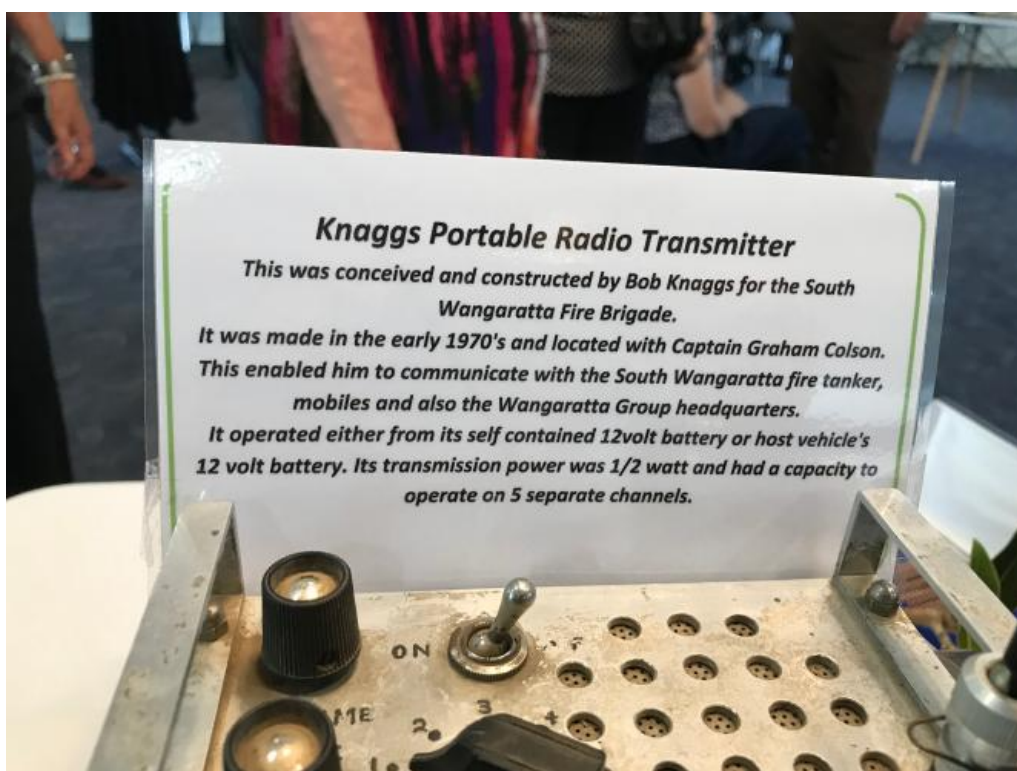
When CFA was formed in 1945, Bob Knaggs had already been a member of South Wangaratta Bushfire Brigade for five years.



Bob passed away earlier this year after giving 80 years of service to South Wangaratta brigade

Bob was a very active member of the brigade, attending many of the fires in the area and neighbouring districts, and went on to become an integral member of both the brigade and the community. Over time Bob took on leadership roles. He was brigade secretary/treasurer for two terms and third lieutenant for two terms, as well as the brigade delegate for the Wangaratta Group for many years.

But it was through his keen interest in radio communication that Bob really made a significant impact both at his brigade and the wider fire brigade community. Bob became the brigade communications officer in 1963 and remained in the role until 1998.



He served on the Wangaratta Group Wireless Committee for a number of years from the 1960s and remained involved in an advisory capacity until 1998.

Through his love of radio communication and his partnership with several other radio enthusiasts Bob opened up a new world for firefighting.

He constructed, then pioneered the use of, a hand-held radio for the fireground – something we now take for granted. Bob also built and installed a radio unit into his own vehicle, which became known as South Wang Mobile.

Over time more vehicles had a 'Bob special' in their car.

This enabled an officer in charge at an incident to set up forward commands and support tanker operations, and really kickstarted radio communications as an innovative tool in the Wangaratta Group and across the state.

Another Knaggs innovation was the listening set. It wasn't something you could carry around in your back pocket, but it was a simple idea that allowed firefighters to find out about incidents, and gave them a heads-up to get ready in case the phone rang and the brigade was called to action. There were no pagers in those days.

The listening sets also allowed the families left behind to find out when the firefighters would return home.

South Wangaratta brigade is also indebted to Bob for his generous donation of a parcel of land that allowed the brigade to build its first fire station.

Bob was a quiet achiever who was awarded an Outstanding Service Badge in 1991, and CFA Life Membership with his 70-year service medal in 2010.



*~CFA News and Media Website*



# VK3RTV UPDATE

News sent in May from Peter Cossins reports;

The final antenna has been installed at Mount View.

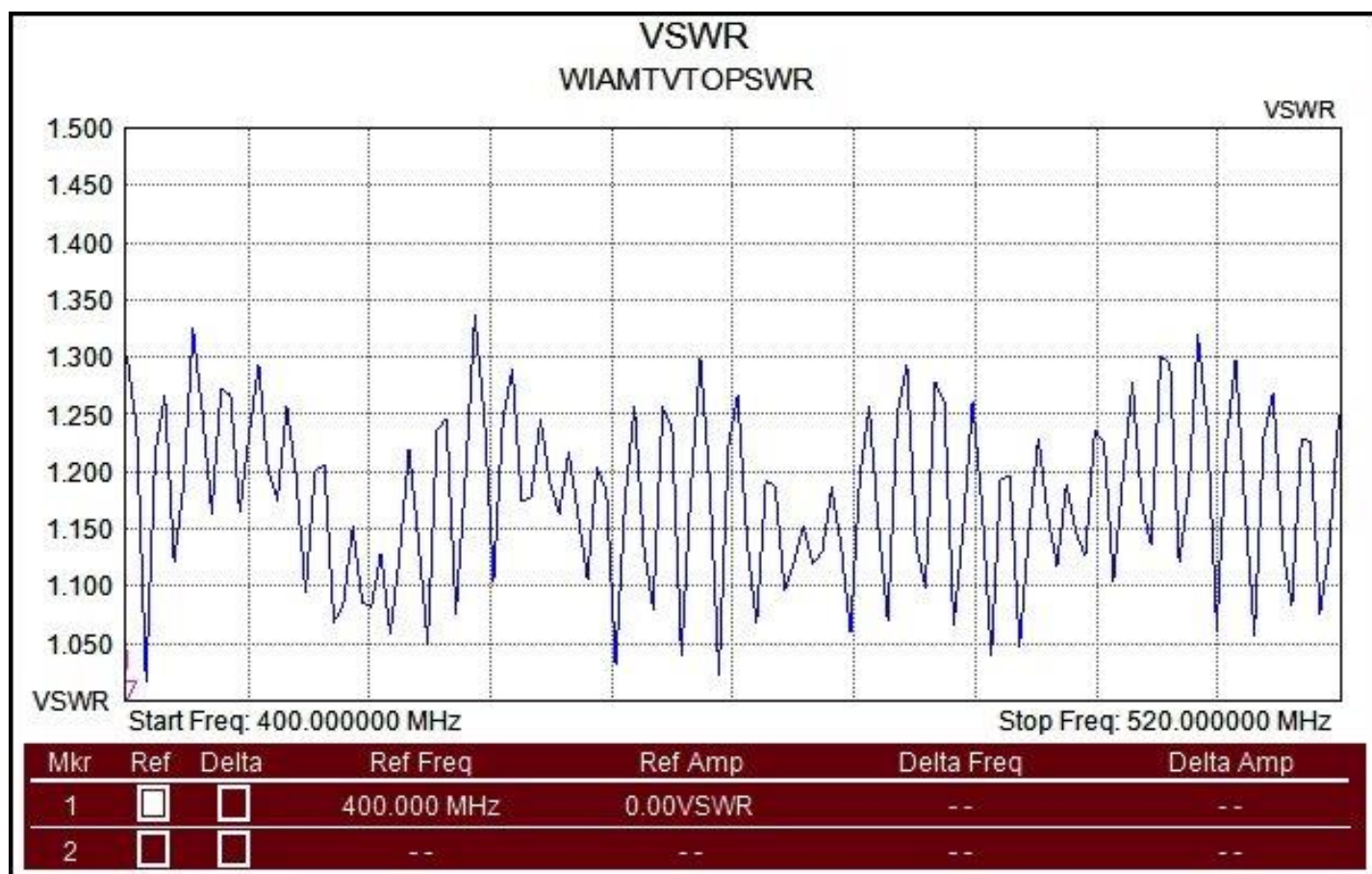
The extended view photographs shows the westerly panel facing out, the north east panel on the adjacent leg above the westerly panel and the south east panel around the back just below.

The new array is obviously right at the top.

The site has restricted access but we should be in a position to install VK3RTV in its entirety in the next few weeks.

A sweep of the new antenna shows a VSWR averaging about 1.175:1 over a frequency range of 400 to 520 MHz.

With the antenna right at the very top of the tower I expect the coverage on 445.5 MHz DVB-T (QPSK) will be very good.”



## Measurement Parameters

Cal Status	On	Fixed CW On/Off	Off
Data Points	130	Serial Number	634118
Date	4/27/2020	Firmware Version	V5.34
Time	1:32:25 PM	Model	S331D







Westerly panel facing out, the north east panel on the adjacent leg above the westerly panel and the south east panel around the back just below

## Bass Hill Repeater

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Please be advised the Base Hill repeater VK3RSG is back on air with a new repeater base station and antenna maintenance. Frequency remains the same 147.1 MHz with a plus 600 KHz shift. Tone access using 91.5Hz Reception reports are welcome.

## Mt William Repeater

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The 2m repeater on Mt William is currently off air waiting the relocation to a new site on the mount. With the current travel restrictions in place it is difficult for riggers and volunteers to attend to finalise the transfer. When completed Mt William 2m will be linked to Mt Arapiles and the new repeater sited on Mt Rouse. This will give increased coverage in the Horsham/Grampians area.

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Google: I find everything!  
Wikipedia: I know everything!  
Facebook: I know everyone!  
Internet: Without me, you guys are nothing!  
Electricity: Yeah, keep talking bitches!!

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I signed up for the newsletter at my local ham market.  
But all they sent was a bunch of spam.

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What do Green Eggs and Ham, and Fifty Shades of Gray have in common?  
They both encourage people who can barely read to try new things.

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What do children learn from Green Eggs and Ham?  
If someone you strongly dislike really wants you to eat something strange for no apparent reason, you should try it.

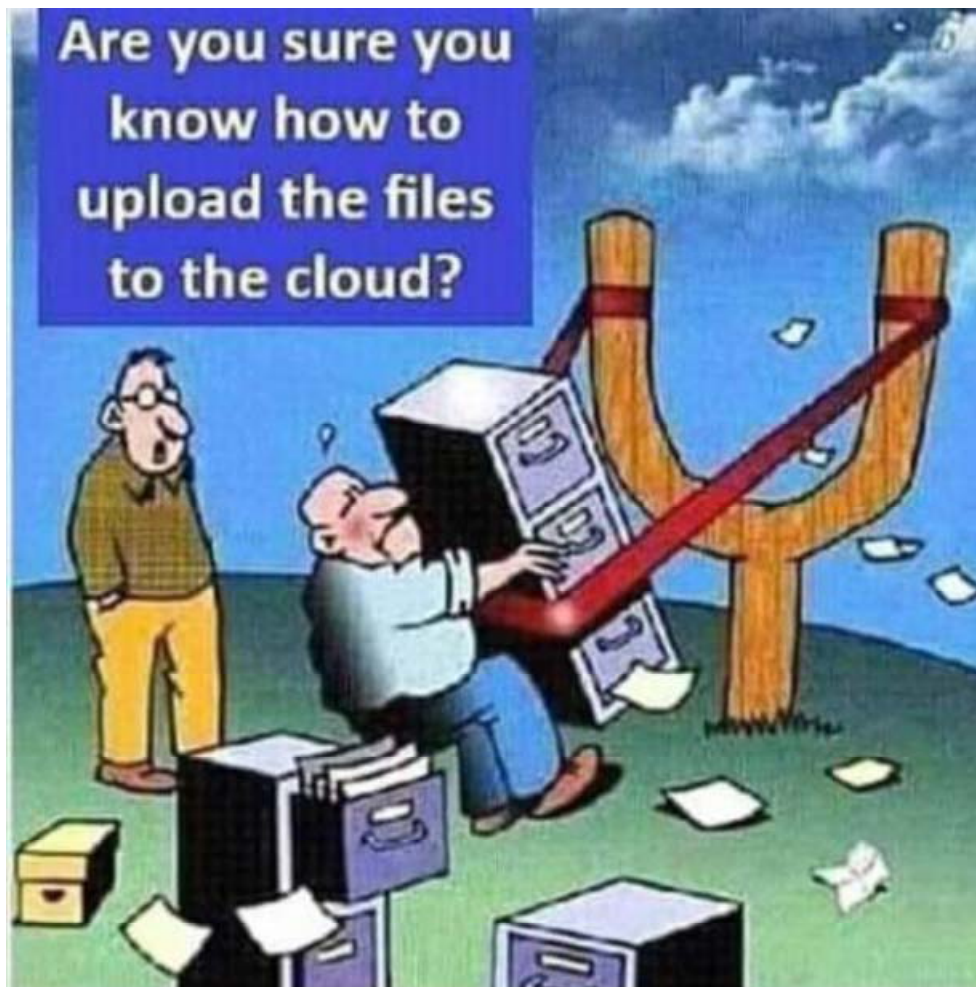
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How does a Ham Radio buff send a break-up message?  
Remorse Code

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Evening news is where they begin with 'Good evening', and then proceed to tell you why it isn't.







I always take life with a grain of salt, ...plus a slice of lemon, ...and a shot of tequila.

A bus station is where a bus stops.

A train station is where a train stops.

On my desk, I have a work station..

A TV can insult your intelligence, but nothing rubs it in like a computer.

When you go into court, you are putting your fate into the hands of people who weren't smart enough to get out of jury duty.

Keep the dream alive: Hit the snooze button.

We have all heard that a million monkeys banging on a million typewriters will eventually reproduce the entire works of Shakespeare. Now, thanks to the Internet, we know this is not true.

To err is human; to blame it on somebody else shows management potential.

Every day, man is making bigger and better fool-proof things, and every day, nature is making bigger and better fools. So far, I think nature is winning.

A fine is a tax for doing wrong. A tax is a fine for doing well.

Be careful of your thoughts, they may become words at any moment.

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## ELECTRIC FIGHT

If you intend to have a wrestling match with electricity it will certainly help if you know your opponent's likely moves. For a start, an electrical current of sufficient intensity which passes through a muscle causes the muscle to contract.

If your opponent is Direct Current, muscle contraction only occurs at the instant of contact as the uni-directional current flow has no further effect on the muscle. It is very rare that Direct Current hangs on. Usually the result of the contraction is to break the circuit.

So it is that DC "throws" its opponent.

On the other hand, should be in the ring with a more fearsome opponent, Alternating Current, you will face different tactics. The rise and fall of AC current intensity means that the muscle in contact receives as many as 100 shocks a second.

This causes the muscle to remain contracted for as long as the current passes through it.

So it is that AC "holds" its opponent. In the final analysis, whether you choose to be either thrown or held (or left alone) is pretty well up to you.

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The Wireless Institute of Australia will be activating a special on-air event to celebrate the WIA 110 Years Anniversary. The Wireless Institute of Australia, as different IARU Societies around the world decided to join a special event in which we encourage as many Amateurs as possible to get on the air and contact as many WIA stations as possible, and in addition, to celebrate the 110 years Anniversary as the oldest Amateur Radio Society in the world.

WIA official stations will operate across Australia call signs are VK1WIA, VK2WIA, VK3WIA, VK4WIA, VK5WIA, VK6WIA, VK7WIA, VK8WIA, and VI110WIA. Those contacting one or more of these Special Event Stations will be eligible for a special commemorative certificate noting their participation. QSL confirmation will be available using eQSL and LOTW.

# How Big Is A Million, Billion, Trillion,

2 thousand is 2,000  
is 2 thousand  
 $= 2 \times 10^3$

2 million is 2,000,000  
is 2 thousand thousands  $= 2 \times 10^3 \times 10^3$   
 $= 2 \times 10^6$

2 billion is 2,000,000,000  
is 2 thousand, thousand, thousands  $= 2 \times 10^3 \times 10^3 \times 10^3$   
 $= 2 \times 10^9$   
or  
is 2 million thousands  
 $= 2 \times 10^6 \times 10^3$   
 $= 2 \times 10^9$

2 trillion is 2,000,000,000,000  
is 2 thousand thousand thousand thousand  
 $= 2 \times 10^3 \times 10^3 \times 10^3 \times 10^3$   
 $= 2 \times 10^{12}$   
or  
is 2 billion thousands  
 $= 2 \times 10^9 \times 10^3$   
 $= 2 \times 10^{12}$   
or  
is 2 million, millions  
 $= 2 \times 10^6 \times 10^6$   
 $= 2 \times 10^{12}$

2 quadrillion is 2,000,000,000,000,000  
is 2 thousand thousand thousand thousand thousand  
 $= 2 \times 10^3 \times 10^3 \times 10^3 \times 10^3 \times 10^3$   
 $= 2 \times 10^{15}$   
or  
is 2 million million thousands  
 $= 2 \times 10^6 \times 10^6 \times 10^3$   
 $= 2 \times 10^{15}$   
or  
is 2 million billions  
 $= 2 \times 10^6 \times 10^9$   
 $= 2 \times 10^{15}$

2 quintillion is 2,000,000,000,000,000,000  
is 2 thousand thousand thousand thousand thousand thousand  
 $= 2 \times 10^3 \times 10^3 \times 10^3 \times 10^3 \times 10^3 \times 10^3$   
 $= 2 \times 10^{18}$   
or  
is 2 trillion million  
is 2 million million millions  
is 2 billion billions  
 $= 2 \times 10^{18}$

The biggest named number that we know is googolplex, ten to the googol power, or  $(10)^{(10^{100})}$ . That's written as a one followed by googol zeroes.

# EVEN NATURE IS SOCIAL DISTANCING...



# An Economic Explanation

It is a slow day in the small East Gippsland town of Mallacoota and the streets are deserted.

Times are tough after the Bushfires and now the COVID-19 Virus restrictions; everyone is in debt, and everybody is living on credit.

A tourist visiting the area drives into the town, stops at the motel, and lays a \$100 bill on the desk saying he wants to inspect the rooms upstairs to pick one for the night.

As soon as he walks upstairs, the motel owner grabs the bill and runs next door to pay his debt to the butcher.

The butcher takes the \$100 and runs down the street to retire his debt to the pig farmer.

The pig farmer takes the \$100 and heads off to pay his bill to his supplier, the Co-op.

The guy at the Co-op takes the \$100 and runs to pay his debt to the local prostitute, who has also been facing hard times and has had to offer her "services" on credit.

The hooker rushes to the hotel and pays off her room bill with the hotel owner.

The motel proprietor then places the \$100 back on the counter so the traveller will not suspect anything.

At that moment the traveller comes down the stairs, states that the rooms are not satisfactory, picks up the \$100 bill and leaves.

No one produced anything.

No one earned anything...

However, the whole town is now out of debt and now looks to the future with a lot more optimism.

**And that is how a Stimulus package works!**



# NEVARC Nets



## 40M Net

10am Local time (East coast)

7.097 MHz LSB

Approximately + or – QRM

Hosted by Ron VK3AHR

***“Australia Ham Radio 40 Meter Net”***

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## 80M Net

Wednesday 20:30 Local time

3.622 MHz LSB

Hosted by Ron VK3AHR

Using the club call VK3ANE

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## 2M Nets

Monday at 2000 local time on

VK3RWO repeater

146.975 MHz

President, VK2VU, Gary  
Vice President, Tom VK3NXT  
Secretary, VK2FKLR, Kathleen  
Treasurer, Amy



## NEVARC CLUB PROFILE

### History

The North East Victoria Amateur Radio Club (NEVARC) formed in 2014.  
As of the 7th August 2014, Incorporated, Registered Incorporation number A0061589C.  
NEVARC is an affiliated club of the Wireless Institute of Australia.

### Meetings

Meetings details are on the club website, the Second Sunday of every month, check for latest scheduled details.  
Meetings held at the Belviour Guides Hall, 6 Silva Drive West Wodonga.  
Meetings commence with a BBQ (with a donation tin for meat) at 12pm with meeting afterwards.  
Members are encouraged to turn up a little earlier for clubroom maintenance.  
Call in Via VK3RWO, 146.975, 123 Hz tone.

### VK3ANE NETS

#### HF

7.097 MHz 10am Local time  
3.622 MHz Wednesday - 8.30pm Local time

#### VHF

VK3RWO Repeater 146.975 MHz—Monday - 8pm Local time  
All nets are hosted by Ron Hanel VK3AHR using the club callsign VK3ANE

### Benefits

To provide the opportunity for Amateur Radio Operators and Short Wave Listeners to enhance their hobby through interaction with other Amateur Radio Operators and Short Wave Listeners. Free technology and related presentations, sponsored construction activities, discounted (and sometimes free) equipment, network of likeminded radio and electronics enthusiasts. Excellent club facilities and environment, ample car parking.

**Website:** [www.nevarc.org.au](http://www.nevarc.org.au)

**Postal:**

**NEVARC Secretary**  
**PO Box 69**  
**Wahgunyah Vic 3683**

**Facebook:** [www.facebook.com/nevicARC/](http://www.facebook.com/nevicARC/)

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All editors' comments and other opinions in submitted articles may not always represent the opinions of the committee or the members of NEVARC, but published in spirit, to promote interest and active discussion on club activities and the promotion of Amateur Radio.

Contributions to NEVARC News are always welcome from members.

Email attachments of Word™, Plain Text, Excel™, PDF™ and JPG are all acceptable.

You can post material to the Post Office Box address at the top of this page, or email [magazine@nevarc.org.au](mailto:magazine@nevarc.org.au)

Please include a stamped self-addressed envelope if you require your submission notes returned.

Email attachments not to exceed 5 Mb in file size. If you have more than 5 Mb, then send it split, in several emails to us.

Attachments of (or thought to be) executable code or virulently affected emails will not be opened.

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While we strive to be accurate, no responsibility taken for errors, omissions, or other perceived deficiencies, in respect of information contained in technical or other articles.

Any dates, times and locations given for upcoming events please check with a reliable source closer to the event.

This is particularly true for pre-planned outdoor activities affected by adverse weather etc.

The club website <http://nevarc.org.au> has current information on planned events and scheduled meeting dates.

You can get the WIA News sent to your inbox each week by simply clicking a link and entering your email address found at [www.wia.org.au](http://www.wia.org.au) The links for either text email or MP3 voice files are there as well as Podcasts and Twitter. This WIA service is FREE.